

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Amendment of Parts 1, 2, 15, 90 and 95 of the)	ET Docket No. 15-26
Commission's Rules to Permit Radar Services)	
in the 76-81 GHz Band)	
)	
Amendment of Part 15 of the Commission's Rules)	RM-11666
to Permit the Operation of Vehicular Radar)	
Services in the 77-78 GHz Band)	
)	
Amendment of Sections 15.35 and 15.253 of the)	ET Docket No. 11-90
Commission's Rules Regarding Operation of)	
Radar Systems in the 76-77 GHz Band)	RM-11555
)	
Amendment of Section 15.253 of the)	ET Docket No. 10-28
Commission's Rules to Permit Fixed Use of)	
Radar in the 76-77 GHz Band)	

**Comments on Proceeding Number 15-26, FCC15-16 Notice of Proposed Rulemaking and
Reconsideration Order for the band of 76-81 GHz Band.**

Navtech Radar Ltd submits these comments in response to the publication of FCC 15-16. All references to paragraphs made within this document refer to the paragraphs in FCC 15-16.

Navtech Radar Ltd Comments

Navtech Radar are a manufacturer of primarily fixed infrastructure radars that can be used in a variety of application areas including Highways Automatic Incident Detection, Automation and Obstacle Detection for industrial machinery and vehicles such as port cranes, locomotives, straddle carriers and bulk loaders. There is also a demand for monitoring and security applications, in particular security and surface movement at airports, protection of critical national infrastructure facilities, energy generation & large private sites, border control and force protection.

The adoption of Smart Motorways in the UK and beyond (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/363960/Englands_motorways_are_getting_smart_leaflet.pdf), heavily relies on automatic detection of stopped vehicles in all weather conditions because the emergency lane is replaced with a vehicle running lane (temporary or full time). The safety risks of stopped vehicles or pedestrians on the highway are mitigated with the early and reliable detection of these and/or other hazards with the use of scanning radars, such as those provided by Navtech Radar. Once an incident or hazard is detected the management system can ensure approaching drivers are warned by roadside message signs, reducing traffic incident fatalities and improving emergency service response times.

Using the emergency lane as a running lane on highways will give economic benefits of extra road capacity, reduced emissions and reduced congestion, without the construction time and costs for

extra road space. Installation and use of fixed radar products on highways allows this extra capacity to be realised whilst maintaining a high level of safety for highway users. Radars in the 76-77GHz band have major advantages over other technologies as they remain effective in bright sunlight, mist, rain and snow. They provide the range resolution and beamwidth needed to work effectively in this application in a package size that is suitable for a roadside installation.

The Swedish Transport Administration, Trafikverket, have chosen the Navtech Radar system for managed motorways around Stockholm and the following reference discusses why this decision was taken: http://www.vtt.fi/files/news/2013/12_13092013/session3_p10_case_sweden.pdf.

Automatic Incident detection in Tunnels is becoming increasingly important as stopped vehicles, pedestrians or lost cargo in the tunnels are a road safety threat to approaching drivers. Scanning radars will detect stopped vehicles or people on the carriageway, where Video based detection is susceptible to high False Alarm rates, and as such alarms are often ignored by tunnel operators. Radars will remain effective and reliable in changing light levels, smoke and fog without regular servicing and cleaning. In fact radar technology is likely to be the only effective solution for imaging in a dense smoke environment, for example in the situation of a fire in a tunnel.

Fixed radar has also become a de-facto standard for tunnels in some regions, for example in Norway radar systems are in use and have been specified for new tunnel developments as they are more cost effective and reliable than video technology. Multiconsult have produced a reference document supporting their decision to use the Navtech Radar system in tunnel projects which can be accessed at the following location (http://www.its-norway.no/ikbViewer/Content/881726/08%20Jensen_Multiconsult.pdf).

Fixed Radar solutions in the 76-77GHz band can help meet the needs within the US for managed motorways, tunnels and Homeland security.

- The US has over 50 road tunnels of a length greater than 1000m
- The Federal Highways Administration has designated Congestion Mitigation as one of its key focuses: <http://www.fhwa.dot.gov/congestion/index.htm>
- FCC have issued a temporary approval to Minnesota Department of Transportation (MnDOT) in March 2015 for a Managed Motorway trial using a Navtech Radar system
- Homeland security for large sites (Airports, Power stations, chemical plants and prisons etc) is of key importance and can be aided by fixed infrastructure wide area surveillance radars

To this end Navtech Radar are generally supportive of the proposed rule changes and have the following specific comments.

Fixed Radars

1. Navtech Radar fully supports the proposal in paragraph 50 to allow the use of fixed infrastructure radars for a range of applications. These should include, but not be limited to highways monitoring, obstacle detection and navigation for industrial machinery including port cranes, mining trucks and locomotives, wide area surveillance and security monitoring for large sites including airports, power stations, chemical plants, prisons and other national infrastructure.
2. In Paragraph 51 the Commission states "fixed radars should be able to co-exist with vehicular radars because they both operate with the same power level and use antennas with narrow beamwidths, thus reducing the chances that the signal from one radar would be within the

main lobe of the receive antenna of the other. In a worst-case scenario, where two radars are aiming directly at each other, fixed radar should have no more impact on vehicular radar than that by another radar located on a stationary vehicle. We continue to believe this is the case". Navtech Radar fully support this point of view and also continue to believe that fixed radar interference should be no more significant than that of vehicle to vehicle radar interference.

3. Navtech Radar supports the conclusion described in paragraph 54. Fundamentally given the principles of the FMCW radar operation within the 76-77GHz band and within the operating limits as defined by the regulations, interference is equally likely with any two given systems. An individual system may suffer the consequences of interference more or less than another system based on how the received signal is processed and how well any proprietary or agreed mitigation techniques are implemented with the respective system. In addition, given that a typical fixed infrastructure radar system has a narrow azimuth beamwidth, often scanning over 360 degrees and mounted at 4m or more above the road surface the risk of interference from it is further reduced compared to the vehicle to vehicle situation. This rationale is also supported by the FCC statement in paragraph 47 which refers to how narrow beamwidth and highly directional antennas should help mitigate any interference issues. Further to the argument above from a few clear examples it can be seen that fixed radar has to date managed to integrate with those of the Automotive industry without report of incidents. Whilst volume of traffic is no measure of incompatibility Navtech Radar would point the commission to the Hindhead tunnel in England where an average of 35,000 vehicles per day travel through a twin bore tunnel with both bores containing Navtech fixed radars providing full coverage for Automatic Incident detection. This tunnel has been in operation for over 1150 days and therefore has had over 40million vehicles pass through of which a significant number will have had 76-77GHz radar fitted and with no reported incidents of interference. In addition over 30 fixed radars have been in place and operating on the E4 highway close to Stockholm, Sweden for more than 2 years and if the analysis is to include the wider Swedish region the total is more than 55 radars units on open roads and tunnels again without report of incidents.
4. The FCC asks, in paragraph 55, whether the fixed infrastructure radars should be limited to 76-77GHz, an alternative 1GHz slot in the 76-81GHz band, or allow their use in the entire 76-81GHz band. Navtech Radar comments that for their current range of products, 1GHz bandwidth is adequate for detecting stopped vehicles, pedestrians and other large objects within the operational range of the radar. Navtech Radar would rely on fixed operation between 76-77GHz as the company's products all utilise this band. Navtech Radar have been using that band for duration of its existence and built the company around these products. Therefore Navtech Radar fully support the 1GHz band between 76-77GHz for fixed radar use.
5. Navtech Radar have demand for several applications where a greater bandwidth would significantly improve system performance. The main applications for this wider bandwidth are below and this would facilitate development of solutions that serve public interest, convenience and safety:
 - Long range man detection (>1km) for Homeland Security of critical national infrastructure, border or force protection where a reduced clutter window by means of higher resolution results in significantly improved detection and tracking at range. This is particularly the case in cluttered environments typical of civilian and urban applications.

- Intelligent highways systems for improving safety and throughput allowing differentiation between vehicles, pedestrians and cyclists as described in Paragraph 29.
- Close following and illegal overtake detection and enforcement where improved resolution results in a reduced false alarm rate and increased positive identification.
- FOD detection radars, primarily for airport use where a 1-2GHz bandwidth would improve positive detection ranges of the radar solution, improving safety.

To this end, Navtech Radar would propose or support an alternative solution of up to 2GHz bandwidth between 76-78GHz to be available for fixed radar. This would allow further product development to occur and increase the bandwidth utilisation by facilitating the industry in developing the various radar types in their authorized specific frequency ranges as proposed in paragraph 69. This would also be in line with the proposals for FOD radars as discussed in paragraph 46.

FOD

6. The FCC propose to move FOD detection radars to Part 95 on a non-exclusive licensed basis and allocate 1GHz additional bandwidth between 77-78GHz. Navtech Radar supports the proposal in paragraph 46 of allocating a total of 2GHz bandwidth to FOD detection radars in the band suggested. Navtech Radar also support the move to Part 95 on a License by Rule basis.
7. Navtech Radar support the conclusion in paragraph 47 that FOD radars should be able to co-exist with other radar applications within the 76-81GHz band for the same reasons that vehicular and fixed radars can co-exist as discussed elsewhere in the FCC document. Navtech Radar would oppose the suggestion to limit the location of the FOD radar to prevent the illumination of public roads as limiting the position of FOD radars may well lead to compromising the full performance of a safety critical device or requiring additional sensors to be installed, increasing cost and limiting the commercial advantage of high performance systems. The argument for not limiting the location of radars in airports is based on the same rationale for co-existence between fixed and vehicle users in this band on the roadside.

Service and Technical Rules

8. The FCC proposal is to move all radar products in the 76-81GHz band to Part 95 on a non-exclusive licensed by Rule basis, as per paragraph 39 and 67, and not to differentiate between radar types or application, thus having one compliance standard for transmit power, bandwidth and spurious emissions etc as per paragraph 69 and Appendix B. Navtech Radar support these proposals.
9. Navtech Radar support the technical assessment that states that the same technical principles that already allow successful shared operation between 76-77GHz should also apply in the 76-81GHz band as stated in paragraph 30 and therefore support the general opening of this band with the same transmission limits as in the current regulations for all radars. Navtech Radar believe the probability of interference over a larger bandwidth decreases due to the two signals having to closely coincide so that the influence of one signal into the other appears within the IF bandwidth. Navtech Radar have submitted an ETSI Technical report, TR 103148

that includes a SEAMCAT analysis on interference modes and can be referenced at:
http://www.etsi.org/deliver/etsi_tr/103100_103199/103148/01.01.01_60/tr_103148v010101p.pdf

10. Paragraphs 48 & 69 proposes a new Part 95 subpart that will accommodate all authorised radar types but not otherwise distinguish among them. Navtech Radar support this proposal and is consistent with the co-existence principles discussed throughout FCC15-16.

Summary

Navtech Radar are in the whole supportive of the proposed changes and can identify clear demand for products that serve the public interest, convenience and safety. These are wholly applicable to the US and the current overly restrictive rules deny these benefits to the citizens of the United States and other FCC governed states.

Navtech Radar support the proposal to allow fixed radars into the 76-77GHz band and FOD radars into the 76-78GHz band. Navtech would also support an additional 1GHz bandwidth for fixed radars giving a frequency range of 76-78GHz to allow for development of further products with enhanced capabilities as previously described.

Based on the co-existence principles described in FCC15-16 and the study carried out in TR 103148, Navtech Radar continue to believe that fixed radar interference should be no more significant than that of vehicle to vehicle radar interference.

These comments are respectfully submitted this day 1st April 2015.

Richard Poulton



Hardware Development Team Leader
Navtech Radar Ltd.
Home Farm
Ardington
Wantage
Oxfordshire
OX12 8PD
United Kingdom
Tel: +44 1235 832419